c) REMARKS

The claims are 1-8, with Claims 1 and 5 being independent. Claim 9 has been cancelled without prejudice or disclaimer of the subject matter therein.

Applicants filed a Transmittal of Amended Drawings on October 24, 2003, in which the replacement drawing sheets containing approved drawing corrections filed June 23, 2003 were incorporated.

Claims 1-4 and 9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 6,488,995 B1 (Nishimoto et al.) in view of U.S. 5,472,508 (Saxena) for the reasons set forth on pages 3-5 in the final Official Action. Claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 6,348,238 B1 (Mizuno et al.) in view of U.S. 3,757,733 (Reinberg) for the reasons set forth on pages 5-6 in the outstanding final Official Action. Cancellation of Claim 9 renders the rejections thereto on the prior art, moot. Applicants respectfully traverse the outstanding grounds of rejection.

Prior to addressing the grounds of rejection, Applicants wish briefly review key features and advantages of the present invention. An important feature of the present claimed invention is forming a deposited film on a substrate using a plasma CVD film-forming vessel while repetitively applying a periodicity voltage having at least two different waveform components having a different amplitude to an auxiliary electrode arranged either at a position in the plasma generation region of the film-forming vessel or on a side opposite a film-forming face of the substrate in the film-forming vessel. Support for this repetitive feature is found, inter alia, in the description of Figs. 5-8 and 8-12. The disclosure of "ONE REPETITIVE CYCLE" includes applying a voltage waveform

comprising at least two different waveform components having a different amplitude. This feature is also supported, inter alia, on page 22, lines 20-25; pages 57, lines 5-25 and page 73, lines 8 to page 74, line 16. In the present invention, the ONE REPETITIVE CYCLE is repeated. This enables one to efficiently dissociate the raw material gas to produce precursors (SiH*, SiH_2*, SiH_3*, H*, and the like) which contribute to forming a deposited film on the substrate at a high yield (see specification page 2).

Moreover, the amplitude potential is preferably made such that radicals, such as H* from hydrogen and SiH* and the like, from a silane, are selectively generated (see page 22, lines 3-7 of the specification). This permits the generation ratio of such radicals to be controlled depending on the number of voltage application repetitive cycles per unit time. Moreover, the application of the periodicity voltage prevents the ion sheath from being formed at the auxiliary electrode (see, at least, page 22, lines 11-15 of the specification).

An example of a waveform of at least two different waveform components having different amplitudes is shown in Figs. 7 and 8. In Fig. 7, there is a first component with a 40 V amplitude and a second component with a 5 V amplitude. The first component has three pulses in the cycle, while the second component has two pulses. In Fig. 8, the first component has four pulses and the second component has one pulse.

The Examiner cites Nishimoto for disclosing a film-forming method for forming a deposited film on a substrate by means of plasma CVD in a film-forming vessel provided with a raw material gas introduction means and an exhaustion means. However, the Examiner admits that Nishimoto does not teach a repetitive application of the

waveform or more specifically that the periodicity voltage has (i) a waveform component having an amplitude capable of generating mainly a radical of a silicon-containing compound and (ii) a waveform component having an amplitude capable of forming mainly a radical of hydrogen. The defects of Nishimoto are not remedied by Saxena.

Saxena is cited to teach a CVD method wherein a voltage is applied to auxiliary electrodes 6 and 8, having a pulse height (amplitude), pulse width, and pulse repetition appropriate for forming radicals of each species being deposited (Abstract, col. 4, lines 17-38, and col. 5, lines 31-45). However, Saxena does not teach or suggest a periodicity voltage having at least two different waveform components having a different amplitude to an auxiliary electrode as disclosed in the present invention.

Moreover, Saxena merely discloses a general method for controlling the film-forming parameters, namely, that pulse height, pulse width and pulse repetition rate of the pulses generated by pulse generator 12 are controlled by control means 12AB (see col. 4, lines 44-46 and col. 5, lines 42-61). Further, Saxena only discloses, without more, that direct current voltage is applied to electrodes 6 and 8 to overlap the pulse to electrode 8 and that direct current voltage can be varied for electrodes 6 and 8 (col. 4, lines 26-31).

However, Saxena neither teaches nor suggests that pulse waveform height is changed or that direct current voltage is periodically changed as disclosed in the instant invention. Further, the instant invention is additionally distinguished from Saxena, as shown in instant Fig. 9, in that by applying a periodical voltage having at least two different waveform components with a different amplitude in one repetitive cycle to the

auxiliary electrode 110, the quantities of the principal precursors in the plasma can be individually controlled.

In Saxena, in col. 4, lines 39-46 and col. 5, line 63 to col. 6, line 3, it is merely disclosed that pulses of voltage are provided which are additive to the voltage supplied by source 8A and that the control means can vary the pulse repetition rate. This is not a disclosure that a voltage waveform is controlled to provide two different components in one repetitive cycle. Saxena suggests that each complete cycle may differ in amplitude, repetition rate or the like, but not that within each repetitive cycle, two different waveforms are generated with differing amplitudes and pulses.

Wherefore, none of the references, whether alone or combined, disclose or suggest the present claimed invention nor render it unpatentable.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

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